CLAIMS

1. A method of performing data detection in a wireless communication system, comprising;

deriving log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;

estimating interference due to the first data stream; and

deriving LLRs for code bits of a second data stream based on the LLRs for the code bits of the first data stream and the estimated interference.

2. The method of claim 1, further comprising:

decoding the LLRs for the code bits of the first data stream to obtain decoded data for the first data stream; and

re-encoding and remodulating the decoded data to obtain remodulated symbols for the first data stream, wherein the interference due to the first data stream is estimated based on the remodulated symbols.

3. The method of claim 1, wherein the LLRs for the code bits of the first data stream are derived from the received symbols in real-time without buffering the received symbols.

4. The method of claim 1, further comprising:

storing the LLRs for the code bits of the first data stream in a buffer; and

storing the LLRs for the code bits of the second data stream in the buffer by overwriting the LLRs for the code bits of the first data stream.

5. The method of claim 1, wherein quadrature phase shift keying (QPSK) is used for both the first and second data streams.

6. The method of claim 1, wherein a modulation scheme with a higher order than quadrature phase shift keying (QPSK) is used for the first data stream, the method further comprising:

deriving received symbol estimates based on the LLRs for the code bits of the first data stream, and wherein the LLRs for the code bits of the second data stream are derived based on the received symbol estimates and the estimated interference.

7. The method of claim 6, wherein the deriving received symbol estimates includes

forming two equations for each received symbol based on LLRs for all code bits of a data symbol carried in the received symbol for the first data stream, and wherein a received symbol estimate for the received symbol is derived from the two equations.

8. The method of claim 1, wherein the LLRs for the code bits of the first and second data streams are derived based on a dual-max approximation.

9. The method of claim 1, further comprising:

deriving channel gain estimates for a wireless channel used for the data transmission, and wherein the LLRs for the code bits of the first and second data streams and the interference due to the first data stream are derived with the channel gain estimates.

10. The method of claim 1, wherein the first data stream is a base stream and the second data stream is an enhancement stream for a hierarchical coded data transmission.

11. The method of claim 1, wherein the wireless communication system utilizes orthogonal frequency division multiplexing (OFDM), and wherein the received symbols are from a plurality of subbands.

12. An apparatus in a wireless communication system, comprising;

a first computation unit operative to derive log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;

an interference estimator operative to estimate interference due to the first data stream; and

a second computation unit operative to derive LLRs for code bits of a second data stream based on the LLRs for the code bits of the first data stream and the estimated interference.

13. The apparatus of claim 12, further comprising:

a decoder operative to decode the LLRs for the code bits of the first data stream to obtain decoded data for the first data stream; and

an encoder and modulator operative to re-encode and remodulate the decoded data to obtain remodulated symbols for the first data stream, and wherein the interference estimator is operative to estimate the interference due to the first data stream based on the remodulated symbols.

14. The apparatus of claim 12, further comprising:

a buffer operative to store the LLRs for the code bits of the first data stream and to store the LLRs for the code bits of the second data stream by overwriting the LLRs for the code bits of the first data stream.

15. The apparatus of claim 12, further comprising:

a channel estimator operative to derive channel gain estimates for a wireless channel used for the data transmission, and wherein the LLRs for the code bits of the first and second data streams and the interference due to the first data stream are derived with the channel gain estimates.

16. An apparatus in a wireless communication system, comprising;

means for deriving log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;

means for estimating interference due to the first data stream; and

means for deriving LLRs for code bits of a second data stream based on the LLRs for the code bits of the first data stream and the estimated interference.

17. The apparatus of claim 16, further comprising:

means for decoding the LLRs for the code bits of the first data stream to obtain decoded data for the first data stream; and

means for re-encoding and remodulating the decoded data to obtain remodulated symbols for the first data stream, wherein the interference due to the first data stream is estimated based on the remodulated symbols.

18. The apparatus of claim 16, wherein the LLRs for the code bits of the first data stream are derived from the received symbols in real-time without buffering the received symbols.

19. The apparatus of claim 16, further comprising:

means for storing the LLRs for the code bits of the first and second data streams, wherein the LLRs for the code bits of the second data stream are stored by overwriting the LLRs for the code bits of the first data stream.

20. A method of performing data detection in a wireless communication system, comprising;

deriving log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;

deriving data symbol estimates for the first data stream based on either the received symbols or the LLRs for the code bits of the first data stream;

estimating interference due to the first data stream based on the data symbol estimates; and

deriving LLRs for code bits of a second data stream based on the received symbols and the estimated interference.

21. The method of claim 20, wherein the data symbol estimates are derived by making hard decisions on either the received symbols or the LLRs for the code bits of the first data stream.

22. The method of claim 20, further comprising:

decoding the LLRs for the code bits of the first data stream to obtain decoded data for the first data stream;

re-encoding and remodulating the decoded data to obtain remodulated symbols for the first data stream; and

adjusting the LLRs for the code bits of the second data stream based on the remodulated symbols and the data symbol estimates for the first data stream.

23. The method of claim 22, wherein the adjusting the LLRs includes

detecting for errors in the data symbol estimates based on the remodulated symbols, and

setting LLRs for code bits of data symbol estimates detected to be in error to erasures for decoding.

24. The method of claim 22, wherein the adjusting the LLRs includes

detecting for errors in the data symbol estimates based on the remodulated symbols,

deriving correction factors for data symbol estimates detected to be in error, and

updating LLRs for code bits of data symbol estimates detected to be in error with the correction factors.

25. The method of claim 20, wherein the LLRs for the code bits of the first and second data streams are derived from the received symbols in real-time without buffering the received symbols.

26. The method of claim 20, further comprising:

buffering the LLRs for the code bits of the first and second data streams for subsequent decoding.

27. An apparatus in a wireless communication system, comprising;

a first computation unit operative to derive log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;

a decision unit operative to derive data symbol estimates for the first data stream based on the received symbols;

an interference estimator operative to estimate interference due to the first data stream based on the data symbol estimates; and

a second computation unit operative to derive LLRs for code bits of a second data stream based on the received symbols and the estimated interference.

28. The apparatus of claim 27, further comprising:

a decoder operative to decode the LLRs for the code bits of the first data stream to obtain decoded data for the first data stream;

an encoder and modulator operative to re-encode and remodulate the decoded data to obtain remodulated symbols for the first data stream; and

an adjustment unit operative to adjust the LLRs for the code bits of the second data stream based on the remodulated symbols and the data symbol estimates for the first data stream.

29. The apparatus of claim 28, further comprising:

a symbol error detector operative to detect for errors in the data symbol estimates based on the remodulated symbols, and wherein the adjustment unit is operative to adjust the LLRs for code bits of data symbol estimates detected to be in error to erasures for decoding.

30. The apparatus of claim 28, further comprising:

a symbol error detector operative to detect for errors in the data symbol estimates based on the remodulated symbols, and wherein the adjustment unit is operative to derive correction factors for data symbol estimates detected to be in error and to update LLRs for code bits of the data symbol estimates detected to be in error with the correction factors.

31. An apparatus in a wireless communication system, comprising;

means for deriving log-likelihood ratios (LLRs) for code bits of a first data stream based on received symbols for a data transmission;

means for deriving data symbol estimates for the first data stream based on the received symbols;

means for estimating interference due to the first data stream based on the data symbol estimates; and

means for deriving LLRs for code bits of a second data stream based on the received symbols and the estimated interference.

32. The apparatus of claim 31, further comprising:

means for decoding the LLRs for the code bits of the first data stream to obtain decoded data for the first data stream;

means for re-encoding and remodulating the decoded data to obtain remodulated symbols for the first data stream; and

means for adjusting the LLRs for the code bits of the second data stream based on the remodulated symbols and the data symbol estimates for the first data stream.

33. The apparatus of claim 32, wherein the means for adjusting the LLRs includes

means for detecting for errors in the data symbol estimates based on the remodulated symbols, and

means for setting LLRs for code bits of data symbol estimates detected to be in error to erasures for decoding.

34. The apparatus of claim 32, wherein the means for adjusting the LLRs includes

means for detecting for errors in the data symbol estimates based on the remodulated symbols,

means for deriving correction factors for data symbol estimates detected to be in error, and

means for updating LLRs for code bits of data symbol estimates detected to be in error with the correction factors.